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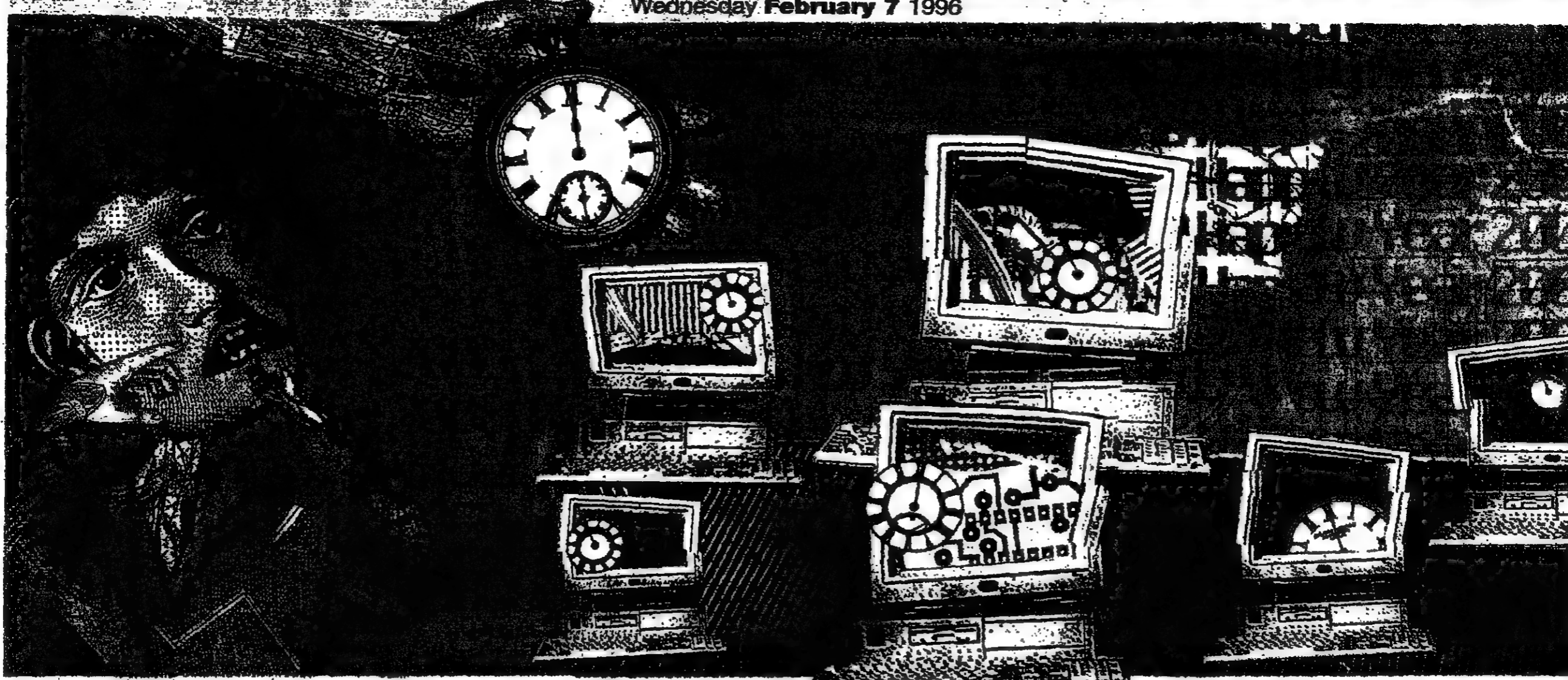
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Information Technology

Wednesday February 7 1996



Software timebomb ticks away

With the year 2000 just 47 months away, many businesses face serious and costly disruptions because of the way older computers calculate dates, writes Paul Taylor

Of all the challenges which the start of the next millennium will present for business and other organisations, few are as serious as the software timebomb ticking away within many computer systems. It is a worldwide problem, which on some estimates could cost up to \$600m to solve.

"The year 2000 poses one of the most significant challenges ever faced by the IT industry and it will have an enormous impact on business applications, package solutions and systems software, even putting some companies out of business," warns Kevin Schick of Gartner, the IT research and consultancy group.

Yet, many companies are still unaware of the so-called Year 2000 problem, or they have chosen to ignore it, or believe that with 47 months still remaining of the twentieth century, there is still plenty of time to put things right.

So what is all the fuss about? Most older computer programmes, particularly those that run on 'legacy' mainframe machines, store dates in the dd/mm/yy or mm/dd/yy format - using two rather than four digits to designate the year. As a result, they cannot distinguish between the year 1910 and 2010 - both of which would be identified by the double digit 50.

At the same time, all date calculations are also affected. For example, a loan which starts in 1998 and ends in 2000 will be calculated as a minus 98-year loan instead of a four-year loan.

"Many businesses will be affected by the Year 2000 problem long before December 1999," says Micro Focus, the mainframe software specialist. It has established a special Year 2000 team led by US-based Dwight Cornwell.

Among the software applications which

are likely to be affected will be those dealing with forecasting, loans, insurance policies, transport schedules, retirement benefits, as well as others which will either stop functioning or produce incorrect calculations without attention.

Some software is also unable to cope with the fact that although the millennium is divisible by 100, it can also be divided by 400 and is, therefore, a leap year.

Other issues include the use of the numbers 00 and 99 by programmers to indicate a null entry or the final record in a database. In the case of older personal computers, many will reset their internal clocks to January 1980 at midnight on December 31, 1999.

If there were only a few isolated instances of problem dates or date calculations, the solution might be relatively simple. However, with millions of lines of computer code and complex interdependencies involved, it is an all-pervasive problem capable of causing disruption throughout an organisation and even beyond.

The problem has arisen because of the limitations of early computer technology and the high cost of storing information when the first commercial computers came into use in the 1960s. At the time, not storing the extra two digits denoting the century was an enormous space-

saver - and thus a big cost-saver.

Although the Year 2000 problem has been acknowledged since the 1980s - and some programmes written since then store dates in the full format - many of those in charge of corporate information technology systems have chosen to brush it under the carpet.

By the end of 1997, Gartner expects less than 30 per cent to have achieved full Year 2000 compliance, a figure which still only rises to less than 50 per cent by the end of 1999.

There are several reasons for this reluctance to come to grips with the issue.

□ Firstly, it could be seen, to some extent at least, as a problem which IT professionals had brought upon themselves.

□ Secondly, at a time when many companies were focusing on short-term business horizons, the end of the century seemed a long way away. Some IT directors may have thought, too, that they would have retired, or moved companies by then.

□ Thirdly, correcting the problem will be very expensive and bring little if any other benefits. Asking the board for funds may as a result have appeared an unattractive proposition.

"People seem to think the millennium issue will magically disappear, but in reality it is a basic computer problem requiring a lot of surgery that must be understood, planned and addressed," says Ian Taylor, chairman of CMG, the computer services group. "A virus is simple compared to the millennium issue."

Delay in dealing with the problem will probably add to the eventual cost of re-coding programmes, and in many cases is not an option anyway.

Gartner, which has issued a series of research notes on the subject over the past 18 months, suggests that about 20 per cent of business applications would have failed last year without corrective measures, and that by 1999 this figure will have risen to more than 80 per cent.

The high cost of solving the Year 2000 problem

For a medium-sized company with about 5,000 programmes which support business operations, Gartner estimates the cost of the Year 2000 crisis will be about \$450 to \$600 per programme or \$3.6m to \$4.2m for larger organisations. Dun & Bradstreet Software has estimated the cost could be as high as \$100m. Much of the costs relate to programmers' time.

It would take 24 people one year to implement a solution in the example above. Alternatively, 12 people using 'software tools' developed specifically for this

purpose, could be occupied for one year, in addition to any time needed to gain experience with the tools.

"That assumes the company can afford to allocate staff away from other priorities," notes Gartner.

In practice, many companies are turning to outside specialists to help them with the Year 2000 crisis. Hardware vendors such as IBM and Unisys, software companies such as Micro Focus, consulting firms, such as Andersen Consulting, and computer services companies, including CMG, Viasoft and Cap Gemini have all built up expertise in this area.

Viasoft, a US-based software tools company, has developed a three-phase approach to the problem - assess, plan, execute - and these activities are grouped together into what the company terms a comprehensive solution, Enterprise 2000. Customers can sign up for the whole process, or just for those elements they wish to utilise.

Viasoft worked with a client in the insurance and banking industry which had already been experiencing problems with the millennium issue. When Viasoft conducted its software audit, it discovered that from a portfolio of 10,000 mainframe programmes, 79 per cent of data items included references to date, and within this group three per cent required changing.

"Although three per cent may appear insignificant, in many years the effort is most certainly not," says Stuart Watkinson, general manager of Viasoft in the UK. "It took 44 man years to correct the problem and ensure the code was millennium compliant."

Because the available external resources are limited, if the problem isn't addressed at an early stage, there may not be anyone available with the appropriate knowledge later on.

Indeed, most of the programmes affected by the Year 2000 problems are written in an ageing mainframe language called Cobol and although there are still a large number of Cobol programmers around, in the US the number is decreasing by about 1 per cent a year as programmers move towards more fashionable and modern languages.

"As we approach the year 2000, the number of available Cobol programmers will decline quickly," warns Viasoft. "The time to start is now," says Watkinson.

To reduce costs and help automate the process most specialists employ diagnostic and conversion tools - "there are more and more tools and toolkits available," says Elaine Eustace, CMG's Year 2000 specialist. Among the main suppliers are Viasoft, Micro Focus and Adpac.

"To minimise their exposure to the Year 2000 crisis, IT departments must begin immediately to analyse their applications portfolios, assess the extent of the problem and begin budgeting, planning for and implementing the potentially extensive corrective measures that will be required," says Gartner.

There are, Gartner's Schick points out, just three certainties in this work: "death, taxes - and the year 2000."

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By Paul Tash

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By John Kane

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IT in government

The political impact of information technology

By Philip Manchester

How IT delivers more power to the people

'As citizens who have become more computer-literate, future populations are not going to be happy about handling government bureaucracy in the way they have in the past. They expect something better now'

Information technology has been a political hot potato since the mid-1960s when the UK's former prime minister Harold Wilson linked the future of Britain to the "white heat of technology".

Through the 1960s and 1970s, government initiatives aimed at promoting indigenous IT industries were a regular feature of political manifestos across the western world. This, of course, was the time of the Cold War and massive military spending - much of which went directly into IT projects.

Project Vote Smart

Lifting the lid on US politics

Stephen McGookin looks at what is called 'a voter's self-defense system'

Just as governments are increasingly using the Internet to distribute information - either purely factual or with their own particular "spin" - citizens groups have just as expertly used the technology to let politicians know they do not have everything their own way, and keep tabs on their performance.

One of the most successful is Project Vote Smart, a way of electronically taking the lid off what is happening in the confusing and sometimes downright murky world of US politics. And that is exactly what the graphic on its World Wide Web home page (www.vote-smart.org) represents, with the slogan: "It's time to look in on the hired hand."

Vote Smart, which calls itself "a voter's self-defense system," provides access to a huge array of information on elected officials and candidates for national office and gubernatorial posts all across the US.

The project is the main programme of the Center for National Independence in Politics, housed at the Oregon State University campus in Corvallis, and was set up in March 1992.

In the course of that election year, it handled more than 200,000 telephone requests for information, with 34,000 calls on election day itself.

Vote Smart is funded by individual contributions and by money from various non-partisan foundations such as Carnegie and Ford. Since 1994 - the year it went online - it also has an east-coast office at Northeastern University in Boston.

Its honorary co-founders are two former presidents: Democrat Jimmy Carter and Republican Gerald Ford. Among the founders are former Democratic Presidential candidates Michael Dukakis and George McGovern, as well as current Republican Speaker of the House Newt Gingrich and former GOP Presidential candidate Barry Goldwater.

Such a mix of unlikely political bedfellows serves to emphasise the impartiality of Vote Smart. And, like its nearest equivalent in print, the venerable *Almanac of American Politics*, its increasing indispensability.

US Congress members are listed alphabetically and state-by-state. What you get when you call up a Senator is a list of committees on which they sit, a list of their sources of campaign funding, details of their voting record - arranged

by subject or chronologically - along with links to how other Congressmen voted on specific issues.

There is also a performance evaluation by special interest groups, as well as the politician's responses to Vote Smart's own questionnaire, the National Political Awareness Test. If they are up for re-election in the last or current cycles.

In December, twelve out of fifteen Republicans seeking their party's presidential nomination agreed to submit answers to Vote Smart questions on a range of policy topics. Buchanan, Fletcher and Forbes were the "flunkies", while the responses of the others can be read at the Web site.

Although it is fiercely non-partisan, its new service Congress Track allows citizens to monitor specifically the activities of those Republican members who signed up to the "Contract with America" at the 1994 mid-term elections.

Financial data on the candidates is provided by the National Library on Finance in Politics, a non-partisan organisation which gets its information from the Federal Election Committee, to which candidates and PACs (political action committees) must, by law, report.

"The entire effort is aimed at providing tools to ensure public accountability by elected officials to those they represent," is how the project defines its mission; and its site is also a rich resource of related links to other news and political information - like Congressional Quarterly's Campaign Watch bulletins, as well as a guide to where you can cast your virtual vote and take part in online political discussions.

Although it is held in high esteem by political insiders, it is the incredible number of ordinary voters who are using the service that is the best testimony to its success and necessity.

One user left the following endorsement: "I am a divorced, unemployed mother of two small children. I think your project is wonderful and long overdue. I wish I could contribute, but I just can't afford to."

"PS. I have decided I can't afford not to."

● To contact Project Vote Smart if you do not have Internet access, write to: Project Vote Smart, 129 NW Fourth Street #204, Corvallis, Oregon 97330; or from inside the US you can call toll-free on 1-800-622-7827.

Better public services

Continued from facing page:

with secure access to personal information stored on smart-cards, as well as government healthcare databases.

Governments are also beginning to adopt innovative approaches to IT management. In Britain, the Ministry of Defence has formed the first defence information systems agency, the Logistic Information Systems Agency (LISA), under Brigadier Alan Pollard, chief executive.

Formed out of the army's logistic IT directorate, LISA intends to sign partnership agreements with commercial companies to look for new business in other defence and government departments.

On both sides of the Atlantic, governments and public sector agencies have also discovered that the Internet can be a powerful tool for satisfying their commitment to open government and disseminating the vast stores of information which they hold.

They are also actively exploiting the potential of electronic commerce, for example through EDI ordering systems

and the broader use of electronic mail. In Brussels, for example, Logica, the UK-based computer services group, is helping advisory committees and working groups improve their e-mail communications via the Interchange of Data between Administrations (Ida) programme, which aims to build a trans-European public administration network.

More generally, as the CCTA says in its latest annual report, "the development of new applications for IT, especially information superhighways, promises a revolution in public services over the next ten years. Services should become easier to use, quicker and better targeted."

But the Agency also adds: "Possibly the greatest challenge will be managing information so that it can be used in sensible ways. The mechanisms to achieve this must be built into plans for government IT - the superhighway is not here yet, but existing technology can do much to improve services - the challenge is to use it in a way which helps and empowers the citizen."

new forms of IT through the growth of microprocessors, changed this dramatically. Most countries, for example, gave up any pretence at having their own chip-manufacturing capability and concentrated on areas where they had a historical presence.

In the 1990s, attention has switched from the competitive production of IT products to gaining competitive edge through the use of IT. The recent enthusiasm among politicians across the northern hemisphere for the so-called information superhighway is based on using IT effectively - rather than producing world-beating products.

"We've had three ages of IT - the first two characterised by hardware and the most recent by software," says Mr Mark Gladwin of the UK's Central Computers and Telecommunications Agency (CCTA). "The mainframe era was about sharing scarce resources and automating things that we understood. The PC era was about surrounding the mainframe with personal computers. Since about 1993 - when the network allowed us to link hardware

together and the Internet gave us a way to break out of the hardware, attention has moved to software.

"We have gone past the era when the technology was an impediment and we can start thinking about finding the most cost-effective solutions."

Mr Richard Sooth, UK managing director of the French computer giant Groupe Bull, says that politicians' attitude to the use of IT in government are changing: "Apart from strategic necessity, the emphasis is on the use of IT in government administration. Government departments are seeing IT as a way of doing things differently."

Wider access

This, he adds, is partly the result of pressure from citizens who have become more computer-literate - "future populations are not going to be happy about handling government bureaucracy in the way they have in the past. They expect something better now."

Mr Andrew Miller, Labour MP for Ellesmere Port and Neston, acknowledges the change

and sees current IT developments as a challenge both to government and to politicians: "For the first time, IT will empower people lower down the structure of government. Civil servants have greater access to information across departments. This challenges the traditional vertical integration of government administration where information only meets at the top at the Cabinet level. IT means that discussions can be better managed lower down the hierarchy."

In the UK, the Central Information Technology Unit (CITU) has been set up to look at the possibilities IT offers in this area and, although Mr Miller is unconvinced about its short-term success, he accepts that it is an idea that should be pursued.

"I don't believe there is the political will at the ministerial level - but I believe it should be developed. It could lead to public services benefits at the local level so that cross-departmental issues can be handled more effectively and more sensitively," he says.

Mr Miller is a director of Eurim, a cross-party association

of MPs, MEPs and Peers together with corporate members which was set up in 1995 to advance the UK's contribution to pan-European IT activities. One of its key roles is to improve the level of information available to politicians on IT issues.

"It's about building a bridge between parliamentarians and



Andrew Miller, MP: IT will empower people lower down the structure of government

the private sector so we are able to discuss IT issues against a background of what is really happening. We can then go back and advise our respective parties," he explains.

International co-operation on IT issues is also growing as governments recognise that they all face similar problems in re-engineering their national IT infrastructures. Early last year, the G7 countries initiated several co-operative projects aimed at pooling IT experience in the context of government.

The Government On-line project, proposed by Canada and sponsored by the EC, is one of the largest. It covers several areas of IT development, each sponsored by EC members and other countries such as Australia, Sweden, Switzerland and Israel.

"The aim is to exchange information on the ways we are doing things in IT. Use of electronic mail for communications within government, on-line information services so people can see what is going on and interactive information kiosks," explains Mrs Ruth Kerry, co-chair of the project,

which uses IT to show how new technology may be used in government administration - "we're using a variety of technologies - such as Adobe Acrobat to exchange documents and Picturatel for video-conferencing."

Examples also include the use of directory services to set up standard government directories with the X.500 standard which is sponsored by Canada and sharing information across departments, which is being led by the UK.

The US is looking at "one-stop shop" strategies for delivering government information to citizens and Japan is looking at the on-line provision of licences and permits.

Other projects include on-line support for democracy (Sweden) and a compendium of government activities in IT (Canada).

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IT in government

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Transition to resource accounting

Move to on-line on-time systems

Commercial software packages are assisting with a massive change in central government accounting

In the biggest change in government accounting since William Ewart Gladstone - the 19th century British statesman - introduced the current system in 1866, central government is in the process of adopting UK generally accepted accounting practice.

Described by the Chancellor of the Exchequer Kenneth Clarke as "a major milestone in modernising the state," the implementation of commercial accounting packages is playing a key role in increasing public sector efficiency.

Central government will introduce resource accounting in most departments by April 1, 1997 and in all departments by April 1, 1998, with resource budgeting following by the year 2000. Resource accounting involves normal accounting procedures, including recording fixed assets and accruals. The concepts of resource accounting have already been

proven in the executive agencies, which have implemented standard accounting packages to manage themselves on a commercial basis.

Most government departments are using old legacy mainframe systems which were designed specifically for cash accounting, as laid down in the Exchequer and Audit Departments Act of 1866.

Each department is making its own decision on the software needed to implement resource accounting and many are choosing to implement a commercial package. These are proving to be ideally suited for all the departments' new requirements.

The main problem lies in the need to continue to report to Parliament on a cash basis until the full implementation cycle is complete. Commercial packages can produce the summary level cash figures which the Treasury needs to retain control through Public Sector Borrowing Requirement target, but they do not all cope with detailed reporting on the existing cash basis.

The problem lies with the way most accounting software is written, with cash details retained in a separate purchase ledger from cost details in the

nominal ledger. Detailed reports on a cash basis need to report on information split between the two ledgers.

Oracle, which is strong in central government accounting systems, is one of a number of vendors who have been able to build additional "cash vote" modules which can generate the necessary additional cash reports from the two ledgers.

Cash-based reporting is much simpler for those accounting vendors who have written their software to utilise a single combined ledger. This unified ledger identifies each individual account as either being either nominal, revenue or purchase and is far more flexible for many accounting requirements. Systems Union, the market leader in executive agency accounting systems, operates a combined ledger, as do Code, SquareSum and others.

Progress so far is encouraging - "this is one of the most significant changes in the process of government this century," says Mr John Garnett, director of resource management strategy at the Ministry of Agriculture, Fisheries and Food. "We have successfully implemented Oracle Financials, modified to accommodate

dual cash and accrual reporting, and are well on the way to delivery of resource based accounting and budgeting within the timetable."

Introduction of new accounting systems have not posed any additional problems so far, despite the number and scale of projects undertaken.

"We had the usual problems of hardware and software not being as compatible as we were led to believe," says Mr Ian Elrick, head of accounting services at the Department of the Environment, who is using software developed for the Australian government. "Most of the vendors stretched the truth a bit in their responses."

Another problem arises from the departments' lack of knowledge of commercial software - "the early tenders we received clearly showed which system was currently being used," says Mr Laurie Mascott, director of the government division at Systems Union.

"Departments were trying to specify their current system with the addition of accrual accounting. They now have a better understanding of what commercial software can offer and are being less restrictive in

their requirements. It would be a mistake to replicate the current systems."

"Some departments are taking the opportunity to overhaul their internal systems as part of the exercise," says Mr Richard Knight, of the Treasury's resource accounting and budgeting team. "They are able to draw on the example and experience of the Executive Agencies."

Resource accounting will require departments to identify and value assets so that they can be capitalised and depreciated by the new systems, reflecting their economic significance - "this process has been considerably eased by existing initiatives to identify assets," explains Mr Knight.

Separate from the accounts, the White Paper requires a meaningful analysis of output and performance from each department and a report on the achievement of its objectives. The focus on outputs suggests that activity-based costing may be involved, which may require the use of one of the existing specialist ABC software packages.

"Resource accounting is accrual accounting with objectives," says Mr Mascott. "Outputs are to be reported sepa-

ately, which effectively means the introduction of activity-based costing."

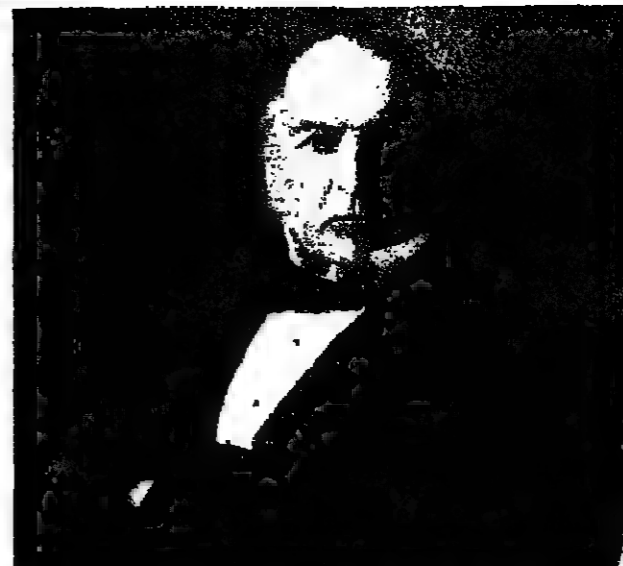
The problems this may cause are hinted at in the White Paper, which says that "the difficulties are not under-estimated."

However, the main challenge has been generating acceptance of the new ways of working which these new systems involve. Civil service users have been trained in the Gladstonian way of thinking and have to adopt new philosophies and ways of working with their new systems.

"Neither the accounting nor the IT is fundamentally difficult, if managed properly," says Mr Garnett.

"The real problems lie in changing the culture. The Chancellor has described us as measuring our performance by the rate at which we burn £10 notes. The new performance measures are intended to represent our equivalent of 'profit' in the private sector and to demonstrate that we are delivering value for money," adds Mr Garnett.

"The challenge is to combine an effective management culture with the existing intellectual culture of the Civil Service. Activity Based Costing is



William Ewart Gladstone (1809-85), British statesman and four times prime minister; he introduced a system for central government accounting in 1866. It is still in use today

one of several tools we will use."

Cultural changes are assisted by better management reporting and "access to information through drill-down," says Mr Elrick. "People can now run their departments from their desks. On-line on-time is the main driver that commercial accounting systems can offer to the process of cultural change and we are moving forward very rapidly."

"This is an exciting development for central government," says Andrew Likierman, head of the Government Accounting Service. The challenge for the

IT industry will be to help those involved to understand and use the new information systems."

Whereas resource accounting is being implemented within the Civil Service, legislation is still required to implement it for reporting to Parliament. When they have approved it, commercial accounting systems will have played a leading role in modernising central government.

Rod Newing, MBA FCA FirstD, is a specialist writer on executive computing (e-mail: rnewing@clx.compulink.co.uk).

EDI and electronic commerce

Faster ways to exchange data in government

Cost-saving project helps 585 local authorities to interpret hundreds of directives on fair trading

Local and central government bodies in the UK are cutting administration costs by up to 80 per cent by using electronic data interchange (EDI) in a unique way to exchange information on trading standards, consumer protection and law enforcement.

The project, winner of the 1996 British Telecom Award for Innovation in Electronic Commerce, was set up after a government study identified huge volumes of information which was being printed by computer systems, sent to other organisations and then keyed into their systems.

The Local Authority Co-ordinating Body on Food and Trading Standards (Lacots), which oversees the project, has now developed standard EDI messages so that the information can be transmitted in set formats and extracted automatically by computer systems at the receiving-end for analysis.

Lacots helps the 585 local authorities to interpret the 70 Acts of Parliament and 200 European Union directives on fair trading to ensure consistency across the country.

It sends a fortnightly circular on recent decisions to enforcement officers and produces an annual index of advice given in different areas.

It also operates a database of the 60,000-plus convictions each year relating to heavy lorries, typically involving overloading. This is accessed by local authorities and other bodies.

Masses of information also pass between local authorities, the Ministry of Agriculture Fisheries and Food, the Office and Fair Trading and other central departments.

"Local authorities handle a million consumer complaints a year and have to send details to the Office of Fair Trading," says Lacots chief executive Jim Humble. "They have to send statistics on food inspections to the Ministry of Agriculture; this is a horrendous document running to 14 pages, with more than 200 boxes to complete on each page."

Previously such data was compiled by each local authority, then printed and sent to the central government department, where it was keyed in to another system for storage, analysis and consolidation, thus raising the risk of human error.

The Lacots project team found that much of the information in such reports was standard and could be arranged in messages following the international Edifact standard message structure for EDI.

A pilot project linking 12 local authorities, Lacots, the Ministry of Agriculture and the Office of Fair Trading and involving EDI software specialist Kewill-Xetal and British Telecom's data network last year proved so successful that it is being extended to 190 trading standard authorities by next month.

An experimental link has also been set up with local authorities in France, and the European Commission is showing interest as a body which gathers consolidated data from European Union members.

This rapid growth follows average savings of 78 per cent. These savings range from 60 per cent on the reporting of food inspections and testing to 80 per cent on exchanges of information with the road traffic convictions database.

In some cases error rates have been cut from 70 per cent to zero. The savings are mostly in staff costs - but the project has also brought important increases in reporting speed.

"If a hazard is discovered in a food or other item, Lacots or the department of Health notifies local authorities, perhaps by letter," Mr Humble says. "A standard EDI message speeds up that process considerably. In addition, if a local authority stops a lorry on suspicion of being overloaded, it needs fast access to the convictions register: again, EDI extracts the relevant information and gets it back quickly."

The enthusiastic response to the system by local authorities and central government departments is leading to expansion in other directions. The pilot involved the development of eight EDI messages - and 30 more have since been identified, plus nine electronic mail applications.

John Kavanagh

Advances in data storage

Continued from previous page

within five years from last year's February start date.

"The project is well-conceived and can have significant impact on the industry as a whole," predicts Dumstan. "The government have been somewhat enlightened in tackling the problem this way."

The drive will be compatible with the current PC Card standard for credit card-sized notebook and palmtop computer add-ons and will have to offer a high level of ruggedness and be able to operate in both hot and sub-zero weather condi-

tions. Dumstan explains that although many observers see the existence of "healthy competition" in the technology sector as a strong driving factor in boosting research, it is not always the case - "In developing PC hard disk drives, you start with price and work backwards: that being the case, the battle you have to fight is making enough profit to be able to help push the technology forward," he says. Once, most companies followed a few large technology leaders, "but now individual companies have to promote new technologies out of their own pockets."

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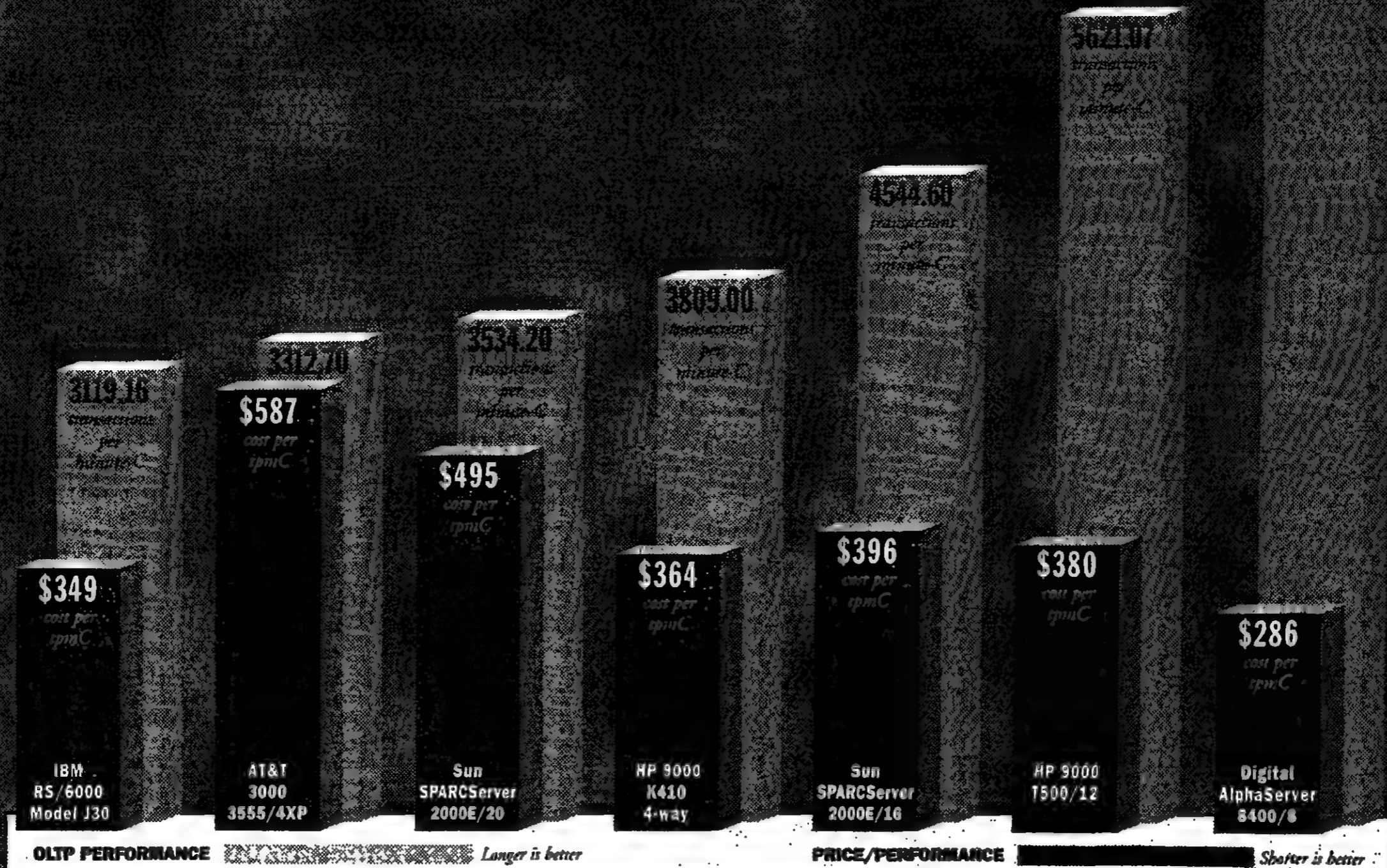
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مكتبات الكويت

■ Telemedicine

By Geoffrey Wheelwright

Boon for rural areas

Computer technology and high-speed network links are changing the face of medical services in rural communities

The emerging science of 'telemedicine' - using systems that combine personal computers, video-conferencing and high-speed data transmission - is now playing an important role in many small North American towns and lonely, country outposts. Telemedicine uses techniques such as video-conferencing as well as patient and diagnostic information exchange via high-speed computer links to bring the expertise of large urban hospitals to bear on the medical problems of patients in outlying areas, without having to move the patients or send specialised doctors into the field. In the American state of Montana, for example, US West, a telecommunications service provider, has been testing one telemedicine solution for the past two-and-a-half years.

A telemedicine pilot project, known as the Eastern Montana Telemedicine Network (EMTN), has been running since September 1993. It is designed primarily to give rural patients access to physicians, and rural physicians access to specialists. An important secondary goal was ongoing education for healthcare professionals and staff. It involves US West and five medical centres whose provider area covers 37,000 sq miles - with a population density of less than two people per sq mile.

The "hub" of the project (to which remote medical facilities can dial in) is at the Deconess Medical Center in Billings, Montana. Rural users are medical and mental health care facilities in the eastern Montana communities of Culbertson, Sidney, Glendive and Miles City.

US West provides dedicated high-speed networking facilities to each site, connected in a daisy-chain fashion, with access to a 384 Kbps channel for video and another 384 Kbps channel for data. The system makes simultaneous video conferences possible - or allows for the transmission of data during a video conference.

Each site has installed a personal computer-based VTEL media conferencing system with two 27-inch monitors - as well as a camera that pans, tilts and zooms, and a document stand that allows the system to display anything from patient records and x-rays to three-dimensional objects.

US West says the system can be connected to any medical devices that use a standard video output - meaning that pathology slides, endoscopy videos, echocardiograms, electrocardiograms and a variety of other medical imaging can all be transmitted - allowing the more advanced facilities at the urban hub medical centre to do the analysis of the patient's test results.

The system also allows for multi-point video and audio

Telemedicine reduces the isolation of rural medical practice

conferencing (so that groups of doctors and specialists can confer about a case), and for what is called "time conferencing", which functions like a video version of e-mail. On a point-to-point basis, computer conferencing is also available, so that users at two different locations can work simultaneously on a document.

Mr Jim Reid, former director of the EMTN who is now an independent telemedicine consultant with Billings-based Innovative Medical Communications, says that the system has taken some getting used to - "over 50 per cent of the patients surveyed said it wasn't the same as being there in person. But 100 per cent said they would prefer telemedicine to travel."

Meanwhile, another set of telemedicine trials are under way involving facilities on the west coast of the US. The University of Washington has linked doctors in Roman, Mon-

tana; Petersburg, Alaska; Driggs, Idaho and Colville, Washington so that they now have electronic access via interactive computer video to some of the top specialists in the main urban centre of Seattle, Washington.

Hospitals and clinics in each of these towns are part of this telemedicine project with the university, which is designed to evaluate the potential benefit of telemedicine consultations in the delivery of rural medical care. A grant from the Office of Rural Health Policy of the US Department of Human and Health Services funds the three-year project.

Medical consultations take place in locations equipped with desk-top computers and special devices to transmit live video and other images, such as x-rays and high resolution photographs. For example, a rural physician can circle a worrisome spot on an x-ray appearing on his or her computer screen and the circle will appear immediately on the same image on the University of Washington physician's screen in Seattle. The physicians can then see and talk with each other and the patient.

This project is designed to use the least expensive and least complicated technology possible to assure that the technology remains affordable for rural medical facilities. According to organisers, each telemedicine station costs approximately \$13,000 for a basic set-up - with additional costs for extra accessories such as a film scanner and other special medical devices.

Another aim is that the system will provide support for rural physicians who often experience professional isolation, which leads to a high staff turnover in remote areas. But knowing that a consulting specialist is just a phone call away may be the type of support doctors alone in a rural practice need. According to Dr Thomas Norris, principal investigator for the University of Washington telemedicine project, it could make a big difference for doctors and patients - "isolation is the enemy in rural practice. We hope telemedicine can help alleviate it."



Using the multimedia network, experts in specific areas of surgery can now guide other surgeons through complex operations - without needing to be present in the operating theatre

■ High-speed healthcare network

Multimedia saves lives

Philip Manchester reports on the progress of SuperJanet

Leading-edge networking technology is taking UK healthcare into the 21st century. The SuperJanet network, first set up in 1993, provides high-speed multimedia networking to medical researchers and practitioners across Britain.

Funded by the Universities' Funding Council, SuperJanet evolved from the Joint Academic Network (Janet) which operated on an earlier generation of networking technology. SuperJanet uses a high-speed networking technology called asynchronous transfer mode (ATM) to provide the bandwidth capacity needed for multimedia applications, such as video-conferencing. The network runs on leased lines from BT using ATM switching hardware from General DataComm.

SuperJanet allows, for example, students to watch skilled surgeons perform 'live' operations over the network. Students and researchers can also use the network for video-conferencing and to view rare

manuscripts and academic papers held in university libraries, via a desktop computer. "The important thing about ATM is that it gives you the ability to run a multi-service network. It's essential for the sort of application we are running because you have to be able to separate traffic," says Mr John Dyer, technology manager at the UK Education and Research Networking Association (UKERNA).

"We now have 15 sites connected to SuperJanet which can all participate in both data and video services. The video service is full motion, full frame - which is important so we can get the image quality." Six of the sites are regularly involved in the most ambitious aspect of the service which gives students access to surgical teaching. Standard audio visual equipment in operating theatres feeds through to a coder/decoder (codec) connected to the ATM network. There are plans to use SuperJanet as a way of allowing consultants to advise on surgery remotely. An expert in a specific area of surgery could, for example, guide a surgeon through a difficult operation without needing to

Continued on facing page

■ Injury claims processing

By John Madsen

Danish trailblazers

New case records system eradicates paperwork delays

Denmark's Industrial Injuries Board receives 300,000 letters a year - yet it is aiming to become a paperless office by 1997. This project will include document imaging, work-flow systems and electronic data interchange and allow staff to work from home. At the same time it will enable staff to take greater responsibility for cases, increasing their job satisfaction.

The Industrial Injuries Board, an agency of the Ministry of Social Affairs, handles compensation for industrial accidents, work-related illnesses and victims of Nazi occupation from 1940-45. It also advises courts in private insurance cases.

The statistics surrounding the board's activities make the paperless office seem an impossible dream. Its 300 staff get 46,000 new cases a year, receive 1,300 letters a day and send out around 1,500 - amounting to at least 375,000 a year.

The board took a big yet relatively simple step in 1992 by linking its chosen word processing software, Wordperfect, to its case records system.

This has cut the separate keying of the same information into two systems.

"The letters always contain information which is found in the case system, such as names and addresses, details of employers and insurance companies and information on injury dates and diagnoses," says Anne Madsen, the board's deputy director-general.

"Writing, compensation calculation and recording are now done in a single, automatic process."

"The case worker enters the file number and the code of the standard letter to be sent. An individual comment can be added to the letter if necessary. The system prints the letter and updates the case information; for example if the letter is to inform someone of a decision, the case record will be updated with the type of decision."

"If the decision is to award

compensation, the system calculates the amount, inserts it in the letter and, again, updates the case record.

"All this means it is easy to get a quick overview of an entire case, including all the outgoing correspondence, through a single enquiry."

The system links overnight to the national registers to update the central records with any changes of address.

This 1992 development has already had considerable impact. In effect all the tasks which have now been automated were previously done by separate teams: there were staff entering data to the case records system, others word processing letters and a third group handling calculations, in addition to the professional case workers.

Automation cut the need for staff but instead of making half of them redundant the board chose to retrain them to take



Anne Madsen: her staff send out 375,000 letters a year

more responsibility and to improve service.

"We work under contract to the Ministry of Social Affairs and part of the contract is to constantly seek to improve quality," Mrs Madsen says.

"We have surveyed 2,500 direct clients and 300 organisations, such as unions and insurance companies, on their expectations and have set performance targets. For example, letters acknowledging receipt of a claim are sent within five days."

"Technology plays a part here, too: for example we produce weekly information on the numbers and quality of cases processed."

The board is now moving toward a paperless office by introducing still more technology. It is working with computer company Unisys on several projects at once.

One key aim is to stop physically handling 'masses' of letters. A pilot project is under way here on document imaging to store incoming letters as images. Letters are barcoded with reference details for automatic storage to aid retrieval from the correct case files.

An associated work flow project has been set up to identify further efficiency measures and changes to procedures. These projects are based on Unisys Unix computers and a Novell PC network.

The board is also looking at extending these systems to people's homes to support teleworking. This would not be every day but would enable staff to work from home for two or three days a week if they wished.

Meanwhile, telecommunication is being extended to the outside world, typically through electronic data interchange (EDI): the automated exchange of documents in standard formats between computers.

This is generally associated with the transfer of orders and invoices between companies but it is also used for exchanges between public bodies. The board is using it to communicate with hospitals, insurance companies and local authorities to request and receive standard information.

As the document imaging project progresses it will also send images of past correspondence to insurance companies electronically.

Electronic communication could even be extended to individuals: Mrs Madsen points out that well over 60 per cent of homes in Denmark have PCs.

All these developments are in line with the Danish government's Information Society 2000 project, which grew out of a 1994 study commissioned by the relatively new Ministry for Research and IT.

"We want to be trailblazers in the Information Society 2000 project - and we intend to reach our paperless office target by 1997," says Mrs Madsen.

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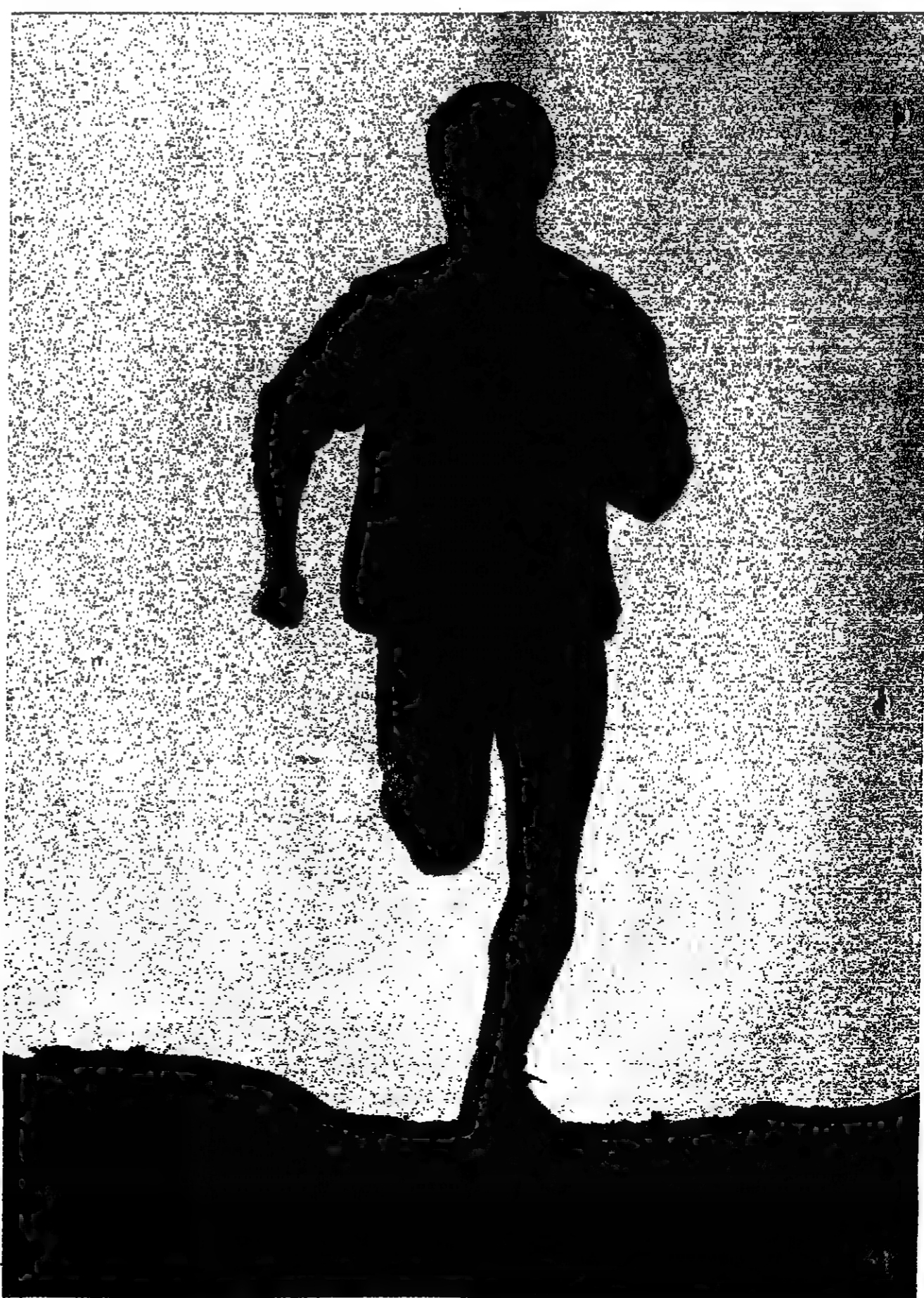
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مكتبة الأصيل

Enterprise intelligence systems: Data access and reporting tools

Reward offered for inside information

Employees want computers to help deliver insights, not just mere numbers

Enterprise intelligence systems, EIS - now rechristened since their first outing as executive information systems - exist so that business users can get their own insight from manipulating the facts and figures.

The old-style EIS presumed that the view from the top needs more insight than anyone else's, and more help getting it. That is a dangerous assumption, according to Mr Nigel Pendse, principal of consultancy OLAP solutions, and co-author of the OLAP (Online Analytical Processing) report by Business Intelligence of Wimbledon.

"EIS for executives was discredited for two reasons," says Mr Pendse. "It was based on the hypothesis that if senior executives had access to data, they would do their jobs better. It was flawed, because that's not how they spend their time - and they tend to rely on people and opinions, not facts and figures."

"Even if true, the double problem was overcoming the technology: the IT people thought a lack of keyboard skills indicated a lack of intelligence, and produced what I call 'petronising' systems."

Hence, argues Mr Pendse, the change from E for Executive to Enterprise or Every-one's in the acronym, EIS. Once the scale changed, from a few users in the boardroom to hundreds of potential users, the EIS price-tag also became unrealistic for a simple information system.

"Eventually the penny dropped that hand-crafting elaborate screen displays was a waste of time; screen displays were not an issue for the people who turned out to be the real users, whether executive or otherwise. The emphasis changed to getting hold of the data," adds Mr Pendse.

"Data turned out to be the real issue: getting hold of it and making it consistent, and delivering it to the right people. The key is automating that entire process," he says.



Software at Work

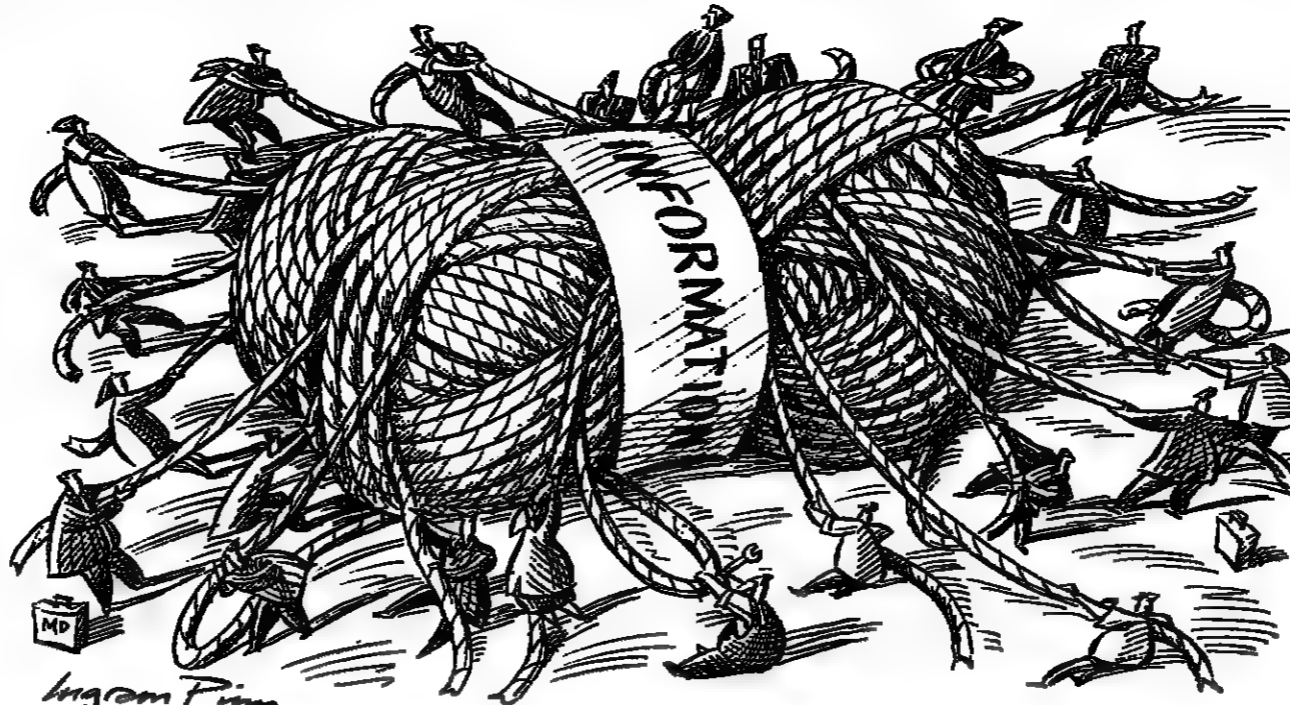
How enterprise intelligence systems help to identify new business opportunities

The trouble with historical data, he adds, is that the company structure will certainly have changed, and the level of historical detail available may not be adequate to re-state the history in a form compatible with the current structure.

The new-wave merchants of "data warehousing" tools have certainly seized on data cleansing as a significant activity. Mr Ram Srinivasan, product director at Los Gatos-based Red Brick Systems, identifies five distinct components of analysis access and reporting - "users need to get data out of operational systems, cleanse, scrub, reconcile it. The business user accessing the data warehouse and asking ad-hoc one-off queries is at the other end of the process."

Red Brick participates in the middle, grasping that data and loading it into the data warehouse database in an overnight window - "an example might be a drug store, updating the day's Epos (electronic point-of-sale) transactions. We help manage data and provide connectivity".

Whereas the old-style EIS systems were delivered to consumers, the data warehouse



approach is to provide users with a query tool which allows them to do it themselves.

In the opinion of Mr Pendse, the difficulty is getting the balance right between tools for experienced computer users,

and giving novice users access to a simple tool - "some of the vendors got it wrong by making it too complicated, and others got it right by pitching it as a simple level, suited to an enormous market. In my opinion, Arbor got it right, so did TM/1 from Simper Corp, and Cognos with PowerPlay, which now has over 100,000 users".

Cognos, he says, has won a larger market by keeping it simple - without being trivial

- whereas Hoios, from holistic, "is labour-intensive to build, but it builds excellent systems. The holistic approach is to have lots of features. Cognos is to keep it simple".

The balance between simple

Data analysis: Towards the information suite

New ways to extract key business data

Companies need more software tools to cope with increasing volumes of information. They may even get them in suites

As competition becomes more intense, the amount of information available is increasing dramatically. Organisations are going to need to analyse and exploit larger volumes of information more effectively than their competitors.

Users may already have Enterprise Information Systems (EIS), On-Line Analytical Processing (OLAP) servers, data warehouses and query tools to provide them with business intelligence, but these are not going to be enough.

OLAP servers provide an

interactive multi-dimensional view of data, using powerful analytical functions and can be accessed by a variety of tools, including spreadsheets and EIS.

A whole range of information tools already exist in specialist areas and they are going to be used more widely in conjunction with existing tools. These will include data mapping, data visualisation, data mining, neural networks, intelligent agents, text search, business rules and others.

Desktop mapping software provides a graphical view of

data, superimposed upon a digital map.

Microsoft says that 90 per cent of corporate data already has a geographical dimension, such as an address or telephone number. This can be converted to latitude and longitude which can now be stored by relational databases.

This, in turn, allows users to explore the business environment geographically, comparing data in relation and proximity.

All this can bring a new vision to the underlying data. It allows users to find new

information, such as how many customer-sites are within a hundred miles of a factory. Integrating external demographic data can show such information as local market sizes and penetration.

Data visualisation tools provide a three dimensional graphical representation of corporate data, showing relationships and relative sizes. Users are able to navigate through a three-dimensional view of their data by steering with a mouse. This shows vertical histograms and lines which show linkages to further analysis.

By following the linkages, data visualisation makes it

easier for users to understand the relationships within different parts of the database. They are able to gain a better overall understanding of the structure of their data and therefore the business environment which it represents.

Data visualisation may also include data mapping. Microsoft has recently demonstrated this as a future function in its Office suite.

Alternatively, data mapping may show a visual picture of where information lies physically within an organisation, allowing users to identify sources of information or related records.

Data mining tools allow users to examine large xpl

"The common applications architecture we use supports all the core process, but the desktop interface integrates images with text, spreadsheets, and all other components of business processes."

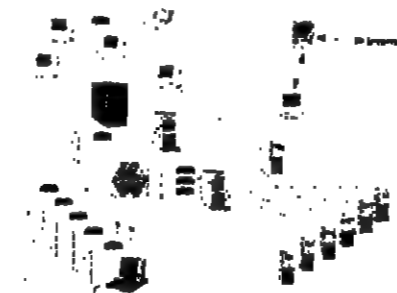
This last idea, of introducing an element of sharing and distribution of the data, could not be further from the original exclusivity of the EIS. Yet it has retained the elements of disparate sources, and different formats.

It is this ability to give the full overview that makes the data warehouse so alluring: a consolidation of data from different sources, with powerful search and retrieval tools which allow the user to travel and explore correlations.

"Business and IT are really acting as one through the data warehouse, which is why it has caught on so fast," concludes Mr Ram Srinivasan. "Management systems allowed people to automate activities in isolation, creating islands of efficiency. This approach turns the picture upside down, connecting these activities so you can look at the situation from the customer's point of view. It changes the basis of competition, so that IT has a wider role in identifying new business opportunities."

By Rod Newling

An AS/400 Advanced Series Solution



is a client/server network that sends sales data throughout the Sega empire instantly

Behind Bill Downs' success in keeping Earth safe from alien life-forms



and the ability to add more power at a moment's notice.



He was also the first at Sega to see that AS/400 Advanced Series could do all this with lower administrative costs than other platforms.

When your business grows from zero pounds to seven hundred and fifty million pounds in five years, choosing a client/server system that can keep up with the growth is pretty important.

Which is what Bill Downs of Sega has found with AS/400 Advanced Series.

"In five years, we probably would have had two or three different business systems if we had started with something that didn't scale as easily as AS/400," says Bill. "None of us had the idea we would grow as fast as we did."

Bill has his AS/400 Advanced Series running the entire business. He's using it to process orders and schedule delivery to 20,000 retail stores overnight. He has his company's PCs, Apple Macs and Silicon Graphics workstations running off it, and his AS/400 Advanced Series does all this with a technology budget of less than two-thirds of one per cent of revenue, and with minimal support staff.

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مكتبة الأصيل

Computer industry trends

By Paul Taylor

The threshold of a significant change

Powerful networks will increasingly unlock corporate 'knowledge' and move it to people who can use it effectively and creatively

The arrival of the desktop personal computer in the early 1980s changed the corporate computing landscape for ever by shifting computing power from the mainframe and the central IT department to the end user.

Quite soon, however, the limitations of systems based around islands of computing power became apparent ushering a second desktop revolution as stand-alone PCs were hooked together to form Local Area Networks (Lans) and then Wide Area Networks (Wans) to share applications, data and peripherals.

In some companies, distributed computer systems and client-server networks have replaced mainframe systems for many applications, including those "mission critical" processes on which organisations depend.

Among the primary beneficiaries of this shift have been hardware vendors such as Compaq Computer, IBM, Digital and other hardware vendors who have developed high-powered machines for the \$11bn-a-year PC-based server market.

Meanwhile, Novell's NetWare has become the undisputed market leader in networking software with more than 80 per cent of the global network operating system market embracing 40m users. At the same time, it faces competition from rivals including Microsoft Windows NT server, IBM Lan Server and Banyan Vines.

Local area networks have been interconnected using devices such as routers, hubs and bridges to form enterprise-wide computing systems since the late 1980s.

As a result, the Lan Internetworking market has become a key focus for network hardware suppliers such as Cisco - the worldwide internetworking

product market leader - 3Com, and Bay Networks. Companies are using a wide variety of methods to connect remote sites and "teleworkers" operating from home. These facilities range from dial-up modem connections over ordinary analogue telephone lines to integrated services digital network (ISDN) connections and dedicated high speed digital links.

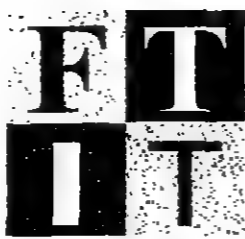
The growing pervasiveness of networking has encouraged vendors such as Cisco, which originally focused on the big corporate market, to launch products aimed specifically at small- and medium-sized businesses and teleworkers.

According to Dataquest, the market research firm, the market for internetworking products aimed at the mid-tier and small office/home office market is estimated to grow from \$5bn to \$17bn by the end of the decade.

Supporting this, a recent survey commissioned by US Robotics, the modem manufacturer, revealed that 80 per cent of UK-based network managers rate dial-up remote access and Wan connectivity as a priority issue for the next 12 months.

The rapid growth of local area networks, client-server systems and internetworking has meant new challenges for IT departments used to dealing with centralised mainframe-based systems and applications.

Faster PCs and network servers and larger multimedia-rich files already mean that many corporate networks, based on traditional technologies, are close to breaking point. As a result, there is increasing interest in high-speed networking technologies such as Fast Ethernet and Asynchronous Transfer Mode (ATM) capable of carrying high volumes of mixed data, voice, graphics and video.



Network-Centric Computing

Route to leaner, smarter operations

Other issues facing IT departments include network security - a key issue, particularly with the growth of connections to the Internet.

Many now argue that the growth of Internet commerce in particular is ushering in another profound change as artificial boundaries between internal corporate networks and the wider external world crumble.

"The distinctions between Inter and Intra-networking are blurring," says Mr Nigel Oakley of 3Com. This new computing model has been dubbed "network-centric computing" by some industry participants, including Mr Louis Gerstner, IBM's chairman.

He believes its advent represents an important opportunity for IBM because the implied requirements for complex network management, systems management, heavy transaction processing, massive databases, powerful scalable servers and systems integration play to the US computer group's strengths.

"We are excited about network-centric computing because if you look at it from the customer viewpoint, they are not really interested in buying it piece by piece," explains Mr Christian Thom-



Louis Gerstner, IBM's chairman: 'The implications of network-centric computing will transform every business organisation and institution in the world'

messen, general manager for IBM network-centric computing in Europe. "We think we have some leverage here."

Similarly, Novell argues: "The value of information technology is rapidly shifting from the power of host and personal computers, to the ability of these systems to connect into the vast resources of the network."

"Businesses are using the network to run leaner and smarter, deploying information resources more efficiently and communicating more effectively both within the organisation and externally with customers, partners and suppliers."

In his keynote address to the Comdex show in Las Vegas in November, Mr Gerstner said the industry was at "the threshold of the next major phase of computing", driven by high-speed, high-bandwidth networking.

The IBM chairman argued that, despite its advantages, "the promise of distributed computing has not been fully delivered."

System incompatibilities mean it has been harder to connect individual devices while client/server computing has also been far more expensive than anyone imagined.

"It is expensive because of

the complexities and also because a lot of customers - especially large organisations - are waking up to the fact that they have put the equivalent of a 1985 mainframe on the desks of every one of their clerical workers - with all the maintenance, backup and service costs now multiplied by thousands, and in some cases tens of thousands," he said.

"We have come to understand that client/server computing is, in fact, not a full-blown phase of computing. It is really the leading edge of what will be the next phase: network-centric computing."

Mr Gerstner argued that, until recently, communications technology had been lagging developments in other fields. "PCs and servers have become enormously powerful, but they communicate through the equivalent of soda straws," he quipped.

"However, that is now changing. Very powerful technologies, including ATM, will be to the next phase of computing what the microprocessor was to the current phase."

More controversially, Mr Gerstner argues that once the communications link between the PC and the network is cheap enough, fast enough and

has virtually unlimited bandwidth, "why not migrate a lot of the functions that currently reside inside the PC to the network - the applications, the data, the storage, and even some of the processing?"

However, he concedes that, "the network-centric world will not replace the PC world entirely any more than the PC world replaced the mainframe world entirely."

At the moment, IBM argues, corporate 'knowledge' is spread across incompatible computer systems; it is distributed across personal computers in various departments, but powerful networks can unlock this knowledge and move it to people who can use it effectively. This drives shorter cycle times and allows teams of people to become more productive and creative.

"As companies use networks to 'push out' to their customers directly, we will see dramatic changes in the nature of competition."

"Companies that stand between a supplier and a customer will be on dangerous ground," warned Mr Gerstner. "The implications of network-centric computing, 'go on and on,'" said the IBM chairman. "It will transform every business, organisation and institution in the world."

Network management

A moving target raises problems

Few systems managers can meet all of today's challenges, says George Black

A standalone computers give way to networks, how to manage those networks effectively has become one of the industry's top priorities.

The problem is how to provide a good service to a fast-growing number of users without incurring fast-growing costs. As yet only some of the necessary answers are available.

Solutions are required at several levels. At the most basic, network managers need to monitor events and keep inventories of all their technology to ensure that usage is properly authorised and paid for. They need to form policies for upgrading hardware and distributing new software. They need to know how well the various components of their networks are performing and when they are likely to need attention.

All this is extremely hard to achieve when people are constantly adding new devices and applications to the network without the knowledge of the network manager.

Surprisingly few network managers have a firm grip on these situations. Also, there are much more elusive objectives on the increasingly prevalent multi-vendor networks than there were on isolated mainframes, minicomputers or personal computers.

A key issue is being able to manage machines and software spanning several different operating systems, including new ones which may become suddenly popular, such as Microsoft's Windows NT.

"Managing distributed organisations is a great challenge and no-one can say they have got all the solutions," says Jolanta Pilecka, software products marketing manager at Hewlett-Packard.

As technology is rapidly

evolving, network management is a moving target - "the number one requirement is that networks must be built for change," observes Mr Pim Dale, product marketing manager for Sun Microsystems. The necessary software tools are becoming more powerful and more widely used, but there is still a long way to go.

Network managers need automated solutions to their problems because they cannot afford to hire more people to do this work. A recent survey across Europe by the UK market research company, Spikes Cavell, shows that, despite rating network management as a top priority of the computer department, three-quarters of companies employ fewer than 10 people to do it. Software

Confusion over standards is hindering progress

that will take some of the strain is therefore high on their shopping lists.

Progress in network management technology has fallen behind the timetable which analysts such as Gartner Group were forecasting a couple of years ago. Some of the key products have not matured as fast as was hoped.

Hewlett-Packard with its OpenView and Sun Microsystems with its Solaris SunNet Manager, dominate the network management tools market. Other important products in the field include IBM's SystemView, also sold by Digital with various modifications in its Polycentre NetView range, and Microsoft's Systems Management Server (SMS).

Hewlett-Packard has now launched the first release of a new client/server version of OpenView called Network Node Manager 4.0 (formerly code-named Tornado). A second release of the product is scheduled for March or April.

Continued on facing page

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■ Network security and data protection

By Tom Foremski in Forestville, California

The never-ending journey

While computer networks continue to transform the way companies work, "the issue of network security is not a one-time event - it is a journey for ever," says a systems expert

As companies increase their use of networks internally and establish links to the Internet and other external networks, the problems of securing their systems and data rise enormously - and there is no easy solution.

Each time a company adds a local area network, or a gateway to the Internet, or adopts the popular distributed client/server model of computing, it increases the security risk because there are more potential areas of access to sensitive information. These risks come not only from outside the company in the form of hackers, but also from within the organisation, from curious or disgruntled employees.

One of the biggest security problems in this area, has been the fact that few business managers have recognised the security risks or taken them seriously. Yet the number of security problems has increased dramatically over the past few years, helping to prod users and the computer industry to develop and deploy more robust security measures.

The results of a survey of 1,200 information system managers, conducted by Ernst & Young late last year, show that the security message is getting through but there is still a lot of education on the issues to be done. Almost half of those taking part in the survey said that their company had experienced security problems that resulted in a financial loss. For about 20 companies, the financial loss was at least \$1m.

About 40 per cent of the survey respondents said that senior management awareness of the security problems was a key obstacle to better security procedures.

"Information technology and the use of networks is causing a renaissance in the way companies conduct business but this means that business people have to realise that protecting information assets is often more important than protecting physical assets," says Fred Jones, director of information security services at systems integrator Electronic Data Systems.

Kathleen Kincaid, director of IT Security Programs at IBM,

says that the media has helped to raise awareness of security problems - "there has been a lot written about security risks and the Internet for example, which has led to people calling us and asking if they might have a security problem."

But many companies start looking for security solutions only if they have had a problem themselves or have heard of a company in the same business that has problems. Mr Jones, at EDS, points out that it is difficult to add-on security to an existing information system. Security must be considered as an integral part of the re-engineering process to be the most effective.

Even in organisations where securing networks is a priority, there are many issues that have to be addressed and the solution can be complicated with many levels of options available - "there is the security of the physical transmission, security at the logical layer, and perhaps an application layer. What I've found is that at each layer people want to secure that layer. And within each layer, there are

different alternatives for transmitting information securely," explains Ms Kincaid.

Encryption technologies and public key/private key mechanisms provide good security but there are many different ways to apply them to different parts of the information system, further complicating the issue.

The good and bad news is that awareness of security on networks is much higher and most computer companies have added security features to their software and hardware products. The bad news is that it is difficult to make all the different parts work well together.

"There is a lot of overlap and holes in the system security when using different products. It can be a real hodge-podge trying to make it all work together," says Jones. "What is needed is the establishment of key security standards and these have to be done on a global scale."

Jones adds that while there is work being done by industry consortia on various security

standards, progress is slow.

Firewalls are a key method of securing networks and there are many new products on the market. Firewalls are hardware and software systems that monitor network traffic and will block network data from coming in or out, based on various criteria, such as sender ID or type of data.

But firewalls are complex to set up - for small companies with little in-house expertise, outsourcing such security measures is often the best solution.

The ideal solution is for security to become a "transparent" application - "security should not hinder the user," points out Mr Jones. "But it is vitally important that the user must be made aware of why the security is there. Staff education is a very important part of any company's security procedures."

Some products, such as the groupware software Notes, from Lotus Development, offer users a simple option to encrypt data by checking a box. Some security systems require users to memorise a list of passwords for different

applications. Passwords work well but they can also easily become a key weakness in a security system. Often, users do not change them regularly, or they use simple and obvious passwords such as their birth date or the name of relatives. Passwords are sometimes even posted near computers.

Encryption technologies lie at the heart of many security measures. These use powerful mathematical operations that make it virtually impossible for an eavesdropper to decode an encrypted message on a network. IBM's Data Encryption Standard and RSA Data Security's public key encryption technology are good examples of reliable and secure encryption technologies.

But the US government limits the use of powerful encryption technologies on the basis that it will make it more difficult for law enforcement agencies to monitor criminal activities.

For example, it is illegal to export certain encryption technologies abroad - a key problem for multinational companies which are unable to use the same encryption technology across their entire enterprise.

The issue of securing networks is also one that is never solved completely. Ms Kincaid makes the point that "security is not a one-time event - it is a journey for ever."



Dealers on the Hong Kong Stock Exchange: security is becoming vital in the financial world, where 'firewalls' are a key method of securing networks. Firewalls are hardware and software systems that monitor network traffic and will block network data from coming in or out, based on various criteria, such as a sender's ID or type of data

■ Global network service

Lotus is first to use BT's new public servers

British Telecom has just set up a global public server service in partnership with Hewlett Packard, writes Rod Neuring.

British Telecom's global communications network will allow it to provide a wide area network service. Hewlett Packard will provide BT with the servers, together with services and expertise, from a "server farm" in Bristol. This will start with between 10 and 20 HP9000 servers, with more being added as demand increases.

Lotus Development Corporation, an IBM subsidiary, was a key participant in establishing the new service which is being launched this month.

This move is part of its strategy to extend the sharing of information between companies and individuals through Lotus Notes Public Network Service. The facility is a special version of Lotus Notes designed to meet the scalability, reliability and administration requirements of public networks, including billing services.

Applications

Organisations will be able to support business processes using BT's global network to integrate with suppliers and customers around the world, using applications located on the public servers.

A single connection to the BT servers means that organisations will no longer need to set up a wide area network within their organisation and with their customers and suppliers. This will reduce the cost of setting up applications and infrastructure for user organisations.

The number of Lotus Notes users is growing rapidly, doubling in the past six months to 4.5m. They can access the servers by point-to-point connections, such as ISDN, the Internet or from cellular telephones.

Notes security is available for each method. The applications can also be designed to be accessed by any Internet browser. Lotus Notes applications on the server will allow

organisations to communicate with customers using data, images, voice, sound, video and other communications formats.

For Lotus, the deal follows similar arrangements with AT&T, Compuserve, Deutsche Telekom, IBM, Nippon Telegraph and Telephone, NTT Data, SNRT, Telettra, Telecom Italia, Telekom Malaysia, Unisource and US West, together accounting for 80 per cent of global data communications traffic.

Competition

By using Lotus Notes, each network will be able to communicate with the others. This is part of a Lotus plan to build a world-wide interoperable network of public networks, linked to the Internet. BT is also carrying out a trial for a similar service in Australia.

Carriers face competition from new entrants, cable operators and the Internet, causing long-distance and international communications to become a commodity.

Public networks provide them with new value added services to offer customers in order to maintain their revenue. Organisations are charged rental for their applications on the servers and users are charged for access. Lotus will participate in this revenue.

Lotus has beaten Novell, who has similar aims with its Smart Global Network, but BT admits that the Lotus deal is the first of many.

When Oracle and Sun talk about "downloading applets" from the server to their network appliances, BT will have one of the main potential sources for software.

■ The next issue of the FT-IT Review on Wednesday, March 8 will feature converging technologies in IT and communications, together with directions in network management.

■ For more information on key themes in future issues, there is a new FT-IT Fax-Back service: see Page 2 of this issue for details.

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INTERNATIONAL COMPANIES AND FINANCE

Philippines cargo group enjoys 57% profits rise

By Edward Luca
in Manila

International Container Terminal Services (ICTSI), the Philippines' largest cargo handling company, saw net profits leap 57 per cent to 320m pesos (\$12.2m) on the back of the country's rapid trade growth in 1995. However, the result was lower than expected by most analysts, who had forecast profit growth of about 70 to 80 per cent.

The company, which has stakes in the recently privatised port of Karachi - Pakistan's largest - as well as in Veracruz, the largest port in Mexico, and Buenos Aires, said improved operating efficiency and the growth of 20 equivalent units (TEU) traffic were behind its good results.

The 30 per cent growth in Philippine trade helped boost the company's TEU handling to about 750,000 last year, 11 per cent higher than in 1994. The company maintained its 75 per cent share of the Philippine market.

The installation of a fifth, 300m-peso berth at its container terminal in Manila, and the introduction of more automated work practices improved efficiency by 12 per cent to 2,600 pesos per TEU. Administrative and operating costs rose 7 per cent to 496m pesos.

Analysts, however, say the company's rising debt-equity ratio, blamed on high capital outlays on its three overseas ventures, gives some cause for concern. At 180 per cent, ICTSI's gearing ratio is considered too high.

"ICTSI has run up a lot of debt," said Gina Dipaling, a researcher at Asia Equity Securities in Manila. "However, if it can overcome the burden of high interest payments, the company's long-term outlook is very bright. It is the most efficient operator in the Philippines and trade growth looks set to continue rising."

ICTSI's shares, which are trading at a p/e of 21 - a 30 per cent premium to the market - closed unchanged yesterday at 16 pesos.

Alcatel hitches wagon to Chinese growth

The People's Republic is expected to generate 10% of sales by 2005, says Tony Walker

Mr Robert Mao, the first Chinese member of Alcatel Alsthom's main telecommunications board, bears a famous surname, but similarities with China's late Chairman Mao Zedong end there.

The Urbane Cornell and MIT-educated Mr Mao represents the new breed of overseas Chinese businessmen which is assuming greater responsibilities in large international corporations as the China market grows and companies such as France's Alcatel globalise.

From his domicile in Taiwan, Mr Mao, 52, will oversee Alcatel's "greater China" operations, including the mainland, Taiwan and Hong Kong. In turn, the company will divide China into two main administrative centres - Beijing and Shanghai - and 12 regions.

Mr Mao says the group "definitely" plans to increase its manufacturing presence in China and intends to become leader in its business sectors. "There is no doubt this is a big, big market and getting bigger," says Mr Mao.

His appointment to the board is the restructuring of Alcatel's activities, which came into effect last month, is part of the conglomerate's attempt to sharpen further its focus in China, where sales topped \$2m last year, or about 5 per cent of global sales of \$36m.

The telecommunications board, reflecting the company's global interests, includes four French nationals, five non-French Europeans, one Ameri-

can, an Australian and a Chinese.

Alcatel claims to be the leading supplier of telecommunications and power plant equipment in China, and market leader in electric railway transport. But it wants to intensify its involvement in China, based on about 20 joint ventures formed between 1983-95.

Mr Serge Tchuruk, chairman and chief executive officer of Alcatel, said in Beijing recently that within a decade the company's China business would account for between 10 per cent and 12 per cent of global sales. Alcatel's future - and especially that of its telecommunications divisions - is tied, therefore, to the continued rapid growth of China's economy.

Alcatel Alsthom is the parent company of the 100-per cent owned Alcatel Telecom and Alcatel Cable; Cegelec, the electrical engineering business; and Saft, the battery maker. It has 50 per cent of GEC Alsthom, which supplies power and transportation equipment, and 44 per cent of Framatome, the nuclear power unit.

All these subsidiaries and affiliates are active in China. Framatome, for example, led the consortium which built the Daya Bay nuclear power station in southern Guangdong province, near Hong Kong, and has the commission to construct stage two. GEC Alsthom has two joint ventures in China, and 18,000MW of generating capacity in operation, under construction or on order.



Robert Mao: 'This is a big, big market and getting bigger'

But telecommunications now leads the way. Sixteen joint ventures formed between 1983 and 1995 span virtually the entire range of modern communications, including digital switching, network management, integrated circuits, fibre-optic cable and digital mobile communication systems.

Alcatel Alsthom has invested about \$160m on the mainland, of which about \$100m has gone into telecommunications, with the balance shared between energy and transportation. In 1995 alone it ploughed \$100m into its China operations and expects to maintain this level of investment for the rest of the decade.

The centrepiece of the company's involvement in China is its 32 per cent stake in the Shanghai Bell Telephone Manufacturing Co (China's Ministry of Posts and Telecommunications has 60 per cent and the Belgian government 8 per cent), whose output is forecast this year to be 5m lines from its new \$170m factory in Shanghai.

Alcatel is using Shanghai Bell, established in 1983, as a springboard for other ventures. Shanghai Bell is a partner, for example, with Shanghai Bell Micro Electronics producing integrated circuits and with Shanghai Bell Alcatel Mobile Communication for digital mobile networks.

Mr Tchuruk says Shanghai

Bell voted the most successful joint venture in China in 1995 in a China Daily poll, will serve as a model for Alcatel Alsthom's continued expansion. He sees the greatest potential in broadband wireless communications and intelligent networks, nuclear power and the provision of clean burning coal technology, and fast trains and the automation of China's transport network.

Mr Mao will co-ordinate Alcatel's disparate telecommunications activities. He expects to spend about six months of each year in China travelling between the company's regional centres. This will be necessary, he says, because purchasing decisions are increasingly being devolved to provincial and municipal level.

In the new scheme of things, Beijing, Shanghai, Taipei and Hong Kong will be Alcatel's "main operating points" for its telecommunications business, Mr Mao says. Beijing is where important policy decisions are made, Shanghai is where innovations take place, Hong Kong is where capital funds are mobilised for investment in Chinese infrastructure and Taipei is the headquarters of an important Alcatel subsidiary.

On the sensitive issue of his Taiwanese origins and domicile, Mr Mao says there is no reason to believe Beijing will take a dim view.

"After all," he says, "to be politically correct, Taiwan is part of China, so I don't think anyone in Beijing would raise that as an issue."

NEWS DIGEST

Sons of Gwalia doubles at halfway

Sons of Gwalia, the acquisitive Australian goldminer which is one of the bidders for Perth-based Gasgoyne Gold Mines, yesterday announced an after-tax profit of A\$16.8m (US\$12.5m) for the six months to the end of December, almost double the A\$8.4m reported for the first half of the previous year.

The company said gold production reached 137,526 ounces, a record, and that revenues from gold sales were A\$91.5m. The average price received for gold sold during the first half was A\$680 an ounce, while the average cash costs for production were A\$338 an ounce.

The company added that, based on current projects, it expected to meet its previously announced production target of 280,000 ounces of gold for the year. Pre-tax and post-tax profits were forecast at A\$46m and A\$30m respectively. However, with gold shares generally marked down yesterday, Gwalia lost 15 cents, to A\$8.90.

Gwalia's bid proposal would see it merging with Burnine, another junior miner, and making an offer for Gasgoyne, giving it a much-enhanced interest in the prospective Yilgarn Star region in Western Australia. However, US-based Coeur d'Alene Mines is also making a rival bid for Gasgoyne.

Nikki Tai, Sydney

Davids plans to bid for QIW

Further evidence of rationalisation in Australia's grocery sector became apparent yesterday after Davids, the New South Wales-based grocery wholesaler, said it was seeking authority from the competition authorities to make a takeover bid for Queensland's QIW. QIW owns the local Spar food retail business, as well as food service operations.

If it gained approval, Davids said it would offer three of its own shares for every two in QIW, valuing its target at about A\$107.5m (US\$81m). Davids added that it expected to report interim profits before tax and abnormal of more than A\$45m.

Nikki Tai

Foster's builds winemaker stake

Foster's Brewing Group, the Australian brewer, said yesterday that it now controlled 23.6 per cent of the shares of Midland Blass, the winemaker for which it launched an A\$452m takeover bid last year. The offer is being extended until February 23.

Nikki Tai

Avon Products acquires Justine

Avon Products, the US-based company, is to acquire the privately-owned South African beauty products manufacturer and direct marketer Justine for an undisclosed sum, Justine said.

Justine would continue selling prestige segment products under its own name and would begin marketing a range of complementary Avon products "priced to reach every South African customer", it said.

Reuters, Johannesburg

S Korea shows strong growth

Net profits of South Korea's listed companies rose 53 per cent in 1995, largely as a result of brisk sales in manufacturing, according to Tong Yang Securities.

In a preliminary report on 622 of 665 listed companies whose fiscal year ended in December, Tong Yang said a combined profit rose from Won5,740bn a year earlier to an estimated Won6,780bn (\$7.44bn). Combined turnover was an estimated Won206,570bn won, up 23 per cent from Won248,970bn in 1994.

Agencies, Seoul

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Backed by these plaudits Alfred Berg is now taking on its next major challenge: The capital markets in the Baltic countries and in Russia. Certainly still slumbering and undeveloped, but carrying an enormous potential.

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BUSINESS AND THE ENVIRONMENT

Basis for a building

Designers of a building intended as a model for low energy and "environmentally aware" offices of the next century are taking their philosophy right down to the foundations.

Crushed concrete from a 12-storey office block being demolished in central London is being used in the Energy Efficient Office of the Future, under construction at the Building Research Establishment's Garston site in Hertfordshire.

In what is said to be the first use in the UK of recycled aggregates in ready mixed concrete, the material from the old bank building is being used as coarse aggregate in more than 1,000 cu m of concrete supplied for foundations, floor slabs and structural columns.

The project is a practical demonstration of work carried out by Rod Collins of BRE's Inorganic Materials Division. Its aim is to show that crushed concrete can be put to high grade use as well as being used for site fill or for landfill engineering.

Use of recycled aggregates would thus support the UK's commitment to the principles of sustainable development and help achieve official targets for the contribution of secondary materials to aggregate supply.

According to BRE, the new concrete's handling characteristics, including its pumpability, have been excellent and completely unaffected by the use of the recycled materials.

The ready mixed concrete was produced at RMC's nearby Rickmansworth plant, using ground blast furnace slag, a by-product of the iron-making industry, to replace at least half of the Portland cement in the two different mixes.

The slag saves money, improves the chemical resistance of the concrete and works well with the recycled aggregate.

Andrew Baxter

France's nuclear tests in the South Pacific may have provided the main focus of controversy for anti-nuclear campaigners in recent months, but for the people of Maki, a town in northern Japan, the big issue is right on their doorstep.

A plan by Tohoku Electric Power, the main electric utility providing electricity in northern Japan, to build a nuclear reactor in the town is hanging in the balance, and may become the latest casualty of rising anti-nuclear sentiment around the country.

Public anxiety over nuclear power is now having a direct effect on the nuclear equipment industry. Last month, in elections for the mayors of the town, residents elected Takaaki Sasaguchi, who had been calling for the country's first referendum on the construction of a nuclear power plant.

The industry's problems have been compounded by the recent leak of three tonnes of non-radioactive sodium coolant from an experimental fast breeder reactor at Monju in western Japan. The reactor, Japan's newest, was closed down after the leak, but local residents want it shut permanently.

As a consequence of this mounting anti-nuclear sentiment, domestic demand for nuclear plants is faltering, and equipment suppliers have been forced to scale down or restructure their nuclear plant divisions.

Little wonder, therefore, that Japan's nuclear power plant builders are looking beyond the country's borders, in the hope that new demand from Asia could offset the problems they are facing at home.

Although Tohoku Electric announced the construction plan for the Maki reactor in 1969, the project has been fraught with problems from the beginning. The company paid local fishermen ¥4bn (£25.5m) in compensation, but was forced to halt administrative procedures in 1983 as land speculators and anti-nuclear groups bought up small plots of land in the planned location.

The plan has divided residents of Maki, a town of 30,000. Calls for a referendum reviewing the reactor construction heightened in 1994 following an abrupt announcement by Kenji Sato, the then mayor who had been elected on an anti-nuclear platform, that he would support the construction of the nuclear power plant.

Sato, who has tried to obstruct a referendum citing "political confusion", resigned last December following a request for his recall accompanied by signatures of 10,231 Maki residents.

Atsuko Takashima, a supporter of Sasaguchi, reckons that the changes in the resident profile of Maki, which has become a dormi-

Public opposition to nuclear power in Japan has forced utilities to go elsewhere, writes Emiko Terazono

Not in my country



The adverse climate for nuclear power has boosted the time needed to obtain local approval for the construction of reactors

tory town for the nearby city of Niigata, have broken old political influences and increased awareness over the nuclear issue.

And while the turnout for last month's elections was a record low 45.8 per cent, Sasaguchi reckons that many residents believed his victory was secure and did not bother to vote. This was because the pro-nuclear camp had failed to find a candidate due to the Monju accident, which occurred a few weeks before the election.

Although the Japanese government's energy plan calls for the construction of 15 nuclear power stations over the next 14 years on top of the current 47 reactors to produce 70.5m kilowatts of power by 2010, there is a fear that the target may not be met.

Some utilities have already abandoned nuclear reactor construction plans. Apart from Tohoku Electric's problems at Maki, Kyushu Electric

Power recently announced a freeze on its plans to site a plant in Miyazaki on the southern island of Kyushu, due to strong local resistance.

The adverse climate for nuclear power plants has boosted the amount of time and funds needed to

As a consequence of this mounting anti-nuclear sentiment, domestic demand is faltering

obtain local approval for the purchase of land and construction of nuclear reactors.

According to a survey by the Ministry of Trade and Industry (MITI), during the 1970s it took 10 years for an electric power company to start operating a plant once the plans

were announced. However, this rose to 17 years during the 1980s and 25 years in the 1990s, and the problem could be aggravated by the Monju accident.

For the Japanese nuclear industry, therefore, the grass looks greener elsewhere. Asia's fast-growing economies are creating huge new demand for electricity, and more than 20 nuclear plant projects are being planned in parts of Asia including China and Indonesia.

Japanese nuclear plant manufacturing groups which include Mitsubishi Heavy Industries, Hitachi and Toshiba are eager to enter the expanding market. Mitsubishi is interested in Indonesia's plant project, while Hitachi and Toshiba will team up with General Electric to bid for Taiwan's planned nuclear reactor.

The overall slowdown in new orders has prompted Japan's nuclear power plant makers to

restructure their operations. Iihikawa-Jima Heavy Industries said it would reduce the workforce in its nuclear power plant division by 200 to 850 over the next few years by shifting employees to other parts of the company. Hitachi also plans to send some of its nuclear engineers to its semiconductor division.

The slowing demand in Japan is especially severe for Mitsubishi group, led by Mitsubishi Heavy Industries which specialises in pressurised water reactors (PWRs).

No plans for PWRs have been announced since an accident in February 1991 at the Mihama PWR plant, which Mitsubishi built for Kansai Electric Utility north of Kyoto. A broken pipe caused 55 tonnes of radioactive water from the primary cooling system to be released into the secondary system which powered the turbine.

Mitsubishi has no new orders after a PWR it is currently building for Kyushu Electric. New reactors planned for construction in Japan over the next five years have been boiling water reactors, which are made by groups led by Hitachi and Toshiba, although PWRs still dominate the international nuclear industry.

Mitsubishi is eager to fill the gap with orders from Asia and says it is probably able to construct a reactor with the expertise it has accumulated domestically. "With other countries cutting down research and development and personnel, Japanese companies have expertise in actually using new technology and building new plants," it says.

But Japanese companies are more likely to team up with their European and US counterparts for projects in Asia rather than bidding alone partly because they are latecomers to the market and partly due to the fact that Japan has yet fully to develop nuclear waste reprocessing.

"The chances are that Asian countries will want to offer the project to a company or a consortium which has nuclear waste reprocessing know-how," says an official at a Japanese plant maker.

The Japanese government is also ready to back the companies by enhancing ties between Asian companies by offering training projects for nuclear regulators. Starting next fiscal year, MITI is planning to accept officials from Asian countries in charge of regulating their nuclear industries to offer training.

In Maki, meanwhile, the newly appointed Sasaguchi says he is not a proponent of a freeze on Tohoku Electric's nuclear plant in Maki, but wants local residents to decide. His first challenge will be passing the town's budget for next fiscal year in March through the town assembly, where the pro-nuclear camp holds a marginal majority.

Net turns green

Crofters in the Scottish highlands could soon be using the Internet to search for information that will help them assess the environmental impact of their farming and land management decisions as part of a project with Edinburgh University.

The crofters, together with a forestry group from Valencia in Spain, will join researchers from the Netherlands, Germany and the UK in a £250,000 project to develop and try out software to back up their long-term decisions about the land.

"We would like to explore to what extent computer technology could be useful in gathering and manipulating information for us," says Bill Ritchie from the Assynt Crofters Trust.

Four years ago, the crofters bought 21,000 acres in the northwest highlands of Scotland on which they are tenants. They now have many plans for the land, but it is in an environmentally sensitive area and they want to assess the impact of their plans on the ecosystem.

Ritchie explains that they hope to build a hydro-electricity generation plant which involves raising the level of a loch. "We want to judge what the long-term effect of that would be on the fishing in the loch and what we can do to minimise any damage," he says.

Ritchie is hopeful that the crofters can gain access to other studies either through the Internet or from other sources. Computer modelling could then apply the data to their own local circumstances.

The Valencian foresters are looking at restoring land that has been burnt by wildfires and want to find information to assist them.

The project will initially last one year, but is likely to be extended for up to four years in order to set up the farmers with the right equipment and skills to use the information they find. It is being funded by the European Union.

Deborah Hargreaves

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Table with multiple columns listing various funds and their performance metrics.

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Table with multiple columns listing various offshore insurance products and their details.

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NASDAQ NATIONAL MARKET

| Top 1000 High Low Stock | | | | | | | | | | Top 1000 High Low Stock | | | | | | | | | | Top 1000 High Low Stock | | | | | | | | | | Top 1000 High Low Stock | | | | | | | | | | |
|-------------------------|-------|-----|-----|-----|-----|-----|----|----|----|-------------------------|-------|-----|-----|-----|-----|-----|----|----|----|-------------------------|-------|-----|-----|-----|-----|-----|----|----|----|-------------------------|-------|-----|-----|-----|-----|-----|----|----|----|----------------|
| - V - | | | | | | | | | | - W - | | | | | | | | | | - X - | | | | | | | | | | - Y - | | | | | | | | | | |
| 57% 100% Vp Co | 1.36 | 2.8 | 12 | 707 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 1.57 | 3.5 | 18 | 180 | 31% | 31% | 3% | 1% | 2% | 24% 100% Vp Co | 1.57 | 3.5 | 18 | 180 | 31% | 31% | 3% | 1% | 2% | 24% 100% Vp Co | 1.57 | 3.5 | 18 | 180 | 31% | 31% | 3% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.52 | 2.1 | 12 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.52 | 2.1 | 12 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.52 | 2.1 | 12 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.52 | 2.1 | 12 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.12 | 1.2 | 11 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.12 | 1.2 | 11 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.12 | 1.2 | 11 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.12 | 1.2 | 11 | 71 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 40% 21 Valvite | 115 | 630 | 23% | 25% | 2% | 1% | 2% | 1% | 2% | 40% 21 Valvite | 115 | 630 | 23% | 25% | 2% | 1% | 2% | 1% | 2% | 40% 21 Valvite | 115 | 630 | 23% | 25% | 2% | 1% | 2% | 1% | 2% | 40% 21 Valvite | 115 | 630 | 23% | 25% | 2% | 1% | 2% | 1% | 2% | 40% 21 Valvite |
| 7 5% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 7 5% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 7 5% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 7 5% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 7 5% Vp Co |
| 11% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 11% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 11% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 11% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 11% 100% Vp Co |
| 12% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 12% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 12% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 12% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 12% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co |
| 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp Co | 0.070 | 1.4 | 6 | 64 | 51% | 48% | 2% | 1% | 2% | 24% 100% Vp | | | | | | | | | | | | | | | | | | | | |

AMEX COMPOSITE PRICES

| Stock | Div. | Yld. | 100s | High | Low | Close | Change | Stock | Div. | Yld. | 100s | High | Low | Close | Change | Stock | Div. | Yld. | 100s | High | Low | Close | Change |
|------------|------|------|------|------|-----|--------|--------|-------------|------|------|------|--------|--------|--------|--------|--------|------|------|------|------|-------|-------|--------|
| Affix Corp | 1.75 | 70 | 81 | 24 | 27 | 27 1/2 | + | Alco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + | Health | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Comer. C.A. | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc | 7 | 81 | 14 | 24 | 27 | 27 1/2 | + | Green & A | 0.40 | 15 | 46 | 18 1/2 | 18 1/2 | 18 1/2 | + | Holco | 0.15 | 17 | 78 | 2 | 1 1/2 | 1 1/2 | + |
| Alfa Inc</ | | | | | | | | | | | | | | | | | | | | | | | |

tion

The business National Negro Laborers said it is confident that its union will not survive the reduction in membership over the next few years.

The criticism of Mr. Hoover was clear yet did not lose its momentum. Mr. Hoover, despite the past, personally backed the program, and was respected by the labor leaders of the movement.

He would not, however, during the referendum. He had made it clear in his speech that he would not support the union. He will be back in the bucket of non-union - he will be back in the bucket of non-union - he will be back in the bucket of non-union.

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